CE216623 – FM0+ I2C Master S6E1B

This application demonstrates I2C communication between a master (this project) and slave (CE216624_I2C_Slave_S6E1B). The master periodically sends an on/off command to the slave, which controls an LED accordingly.

Overview

This Code Example requires two boards in order to show I2C communication. The master connects to the slave and periodically sends single-byte commands. The slave (CE216624_I2C_Slave_S6E1B) reads these commands and turns its LED on or off as commanded.

Requirements

Tool: PSoC Creator 4.0 and Peripheral Driver Library (PDL) 2.1

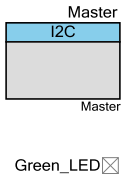
Programming Language: C (GCC 4.9.3)

Associated Parts: All S6E1B parts

Related Hardware: FM0-100L-S6E1B8

Design

The schematic file includes the MFS (I2C) and a GPIO Component, renamed as shown below.



The firmware performs following functions:

1. Initialize the master LED (off)
2. Select the I2C pins and enable pull-up resistors
3. Initialize the MFS block for I2C
4. Send the slave address
5. Start a transmit communication
6. Send the one-byte command
7. Complete the transmit communication
8. Toggle the master LED
9. Change the command
10. Send another command (step #4)

Design Considerations

PDL Installation

The project assumes that you have installed the PDL in the location specified in the **Project Management** panel of the **Tools** > **Options** dialog. If that location is incorrect you will see the build error “The given PDL path is invalid. Unable to find required PDSC file.” To correct this problem in a newly-created project, open the **Project** > **Properties** dialog and enter the correct path to the PDL. To avoid the problem in projects you create in the future, make sure you put the correct path in the **Tools** > **Options** dialog.

Hardware Setup

The LED GPIO is connected to a green LED.

The I2C pins are connected to header CN7 on the kit. SCK is pin 10 (SCK1 on the silk screen) and SDA is pin 9 (SDA1 on the silk screen). It is good practice to also connect GND between the kits using pin 7 on CN7 (or another convenient GND pin).

Table 1 lists the pin connections required to use this code example on FM0-100L-S6E1B8 kits.

Table 1. List of Pins

Pin	FM0-100L-S6E1B8
Green_LED:GPIO	P3E
Master:SCK	P4D
Master:SOT	P4C

Components

Table 2 lists the PSoC Creator Components used in this example, as well as the hardware resources used by each.

Table 2. List of PSoC Creator Components

Component	Version	Hardware Resources
PDL_MFS	1.0	MFS block in I2C mode
PDL_GPIO	1.0	GPIO pin

Parameter Settings

The “Multi-Function Serial I2C” component macro uses mostly default parameter settings, with the following modifications.

Table 3: Component Settings

Tab	Setting	Value
None	Name	Master
Basic	MFSConfig	I2C
I2C	enI2cMsMode	Master
FIFO	u8ByteCount1	0
	u8ByteCount2	0

Operation

Make the wiring connections between two kits as described in Hardware Setup above (power should be detached from the kits).

Connect the kits to your PC using the USB cables. Program one kit with the master (this project) and another with the slave (CE216624_I2C_Slave_S6E1B) project. The application blinks the green LED on both kits in unison.

If the application does not work immediately press and hold the reset buttons on both kits, then release the slave kit, followed by the master. This ensures that the slave is “listening” when the master initiates communication.

Note that it is also possible to use this master with slave projects on the FM0-V48-S6E1A1 and FM0-64L-S6E1C3 kits. You must carefully wire the SDA and SCL pins according to the documentation for each kit.

Related Documents

Table 4 lists relevant application notes, code examples, knowledge base articles, device datasheets, and Component datasheets.

Table 4. Related Documents

PSoC Creator Component Datasheets	
PDL_MFS	Supports I2C, UART, LIN and CSIO (SPI) modes (right-click on the Component to access)
PDL_GPIO	Supports firmware access to physical pins (right-click on the Component to access)
Device Documentation	
S6E1B	FM0+ S6E1B-Series Ultra Low Power ARM® Cortex®-M0+ Microcontroller (MCU) Family
Development Kit (DVK) Documentation	
FM0-100L-S6E1B8	ARM® Cortex®-M0+ MCU Starter Kit with USB and SD Card Interface

Document History

Document Title: CE216623 – FM0+ I2C Master S6E1B

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Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5436964	YFS	09/14/16	New Code Example.
*A	5453421	YFS	02/28/16	Changed the workspace folder name. Renamed the PDF file. Moved the PDF file. Corrected the Documentation entry in XML file.
*B	5776609	YFS	6/16/17	Added search keyword so that user can quickly find Code Examples from the component instance popup menu. Updated logo and copyright date.

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